

Ecology and Distribution of the Slider Skink, *Lerista neviniae*

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Abstract

Many *Lerista* are described based on few individuals, often with little or limited descriptive information which consequently classifies them as data deficient. These species tend to be researched or observed by specialist herpetologists or as part of environmental approval processes for mining or infrastructure development. *Lerista neviniae* was described from three individuals by Smith and Adams (2007) and subsequently listed under the Western Australian *Wildlife Conservation Act 1950* as Vulnerable due to the very small distribution for the species and the increasing pressure on its habitat.

The species is only known to occur in the Cape Lambert area on the north-west coast of Western Australia. This paper presents additional recorded specimens, habitat usage, distribution and potential impacts for the species.

KEYWORDS: Pilbara, Cape Lambert, *Lerista neviniae*, vulnerable, habitat, distribution, impacts

INTRODUCTION

L. neviniae is a small fossorial skink that is very pale with prominent black paravertebral and upper lateral stripes. The skink has four limbs, each with three digits and 18 midbody scale rows (Smith and Adams, 2007; Wilson and Swan, 2013). Due to its pattern it is the most distinctive member of the recently revised *Lerista muelleri* species complex (Smith and Adams, 2007). *L. neviniae* is shown in Plate 1.

The species was described using three specimens. The holotype (Western Australian Museum 135295) was collected in 1997 east of Pope's Nose Creek (20°36'45.6"S, 117°10'39.1"E; the type locality). Two paratypes (Western Australian Museum 151303, 135306) were additionally collected in fore dunes just east of the type locality and approximately 9 km south-west of the type locality. All collection locations are in the general vicinity of Cape Lambert in the Pilbara region of Western Australia. At the time of collection the species had a known distribution limited to several low coastal dunes, with initial estimates of the species' range being approximately 330 ha (Biota, 2008a). The vegetation in the area comprised *Acacia spp.* and other shrubs over *Spinifex longifolius* (Biota, 2008a). Results from hand foraging searches indicated the species utilises small logs or woody debris on white primary dunes of coarse sands (Smith and Adams, 2007).

Cape Lambert is a major export port servicing the mining industry in the Pilbara. Mining has expanded in the Pilbara region significantly in the last 20 to 30 years which has included expansions to the infrastructure in the Cape Lambert area and within the habitat of *L. neviniae* (Biota (2008a, b, c, 2009), GHD (2010a, b, c, 2011), Ninnox (2008), Phoenix (2010), SKM (2009), and API (2009, 2010, 2011)). The aim of this paper is to present new data obtained from field studies in the Cape Lambert area by consultants and private individuals which extends the known range of the species in the region.

METHODOLOGY

As part of environmental approvals processes, a number of targeted surveys has been conducted in the region for *L. neviniae*. Due to this survey effort, a broader area of dune habitat suitable for *L. neviniae* has been surveyed between Karratha and Sherlock Bay. The search areas were disbursed along approximately 70 km of low coastal dunes and associated sandy areas. Additionally, islands in the region have been searched for this species including Dixon, Delambre, Jarman, Legendre, Bezout and Pricard Islands.

Survey techniques included both hand foraging (raking) and pit trapping in sandy areas of suspected habitat of *L. neviniae*. Actual methodology of trap design varied between projects.

A number of unpublished reports and publications was available for review including environmental approval documents (listed above), Smith and Adams (2007), Wilson and Swan (2013) and Richardson *et al.* (2007). Additionally the author has conducted several private field trips to the region undertaking hand foraging surveys (raking) between Karratha and Sherlock Bay in sandy and dune areas within 5 km of the coastal strip. Trips have occurred between 2009 and 2013 for a period of 4–14 days. All *Lerista* specimens were identified using Smith and Adams (2007) and Wilson and Swan (2010, 2013).

Eighteen specimens of *L. neviniae* currently reside in the Western Australian Museum collection. These consist of 16 from the Cape Lambert area and 2 from Dixon Island. These specimens were sexed (15 individuals) and measured for Snout Vent Length (SVL) and Tail Length (TL).

RESULTS

Distribution

The distribution of *L. neviniae* was found to extend beyond the Cape Lambert area and to include the eastern side of



Plate 1. *Lerista neviniae* from eastern Anketell Point. (Photo: Glen Gaikhorst).



Plate 2. *Lerista neviniae* from Cleaverville Beach. (Photo by Bret Stewart).

Dixon Island. On the mainland *L. neviniae* has been found on the coastal fringe from Cleaverville Beach (furthest western point; see Plate 2) and the western side of Dixon Headland, almost to the end of Bouguer Passage around Anketell Point, Cape Lambert to near Point Samson. This includes patchily occupied areas of habitat along a 20 km stretch. At Point Samson, two individuals have been found approximately 2 km inland on isolated dunes. Currently, the known range of the species is approximately 608 hectares in size as shown in Figure 1.

Approximately 75 individuals have been captured. These are mapped below in Figure 2. (Note: multiple specimens have been captured at some sites and this is represented as a single point). Numerous records in the Department of Parks and Wildlife (DPaW) and Western Australian Museum *Naturemap* database have been excluded from this assessment due to inaccuracies.

Habitat

The type locality for this species was briefly described as coastal dunes vegetated by *Acacia coriacea* and low shrubs

(Smith and Adams, 2007). This description was later expanded to include pale coastal dunes with *Acacia spp.* and *Spinifex longifolius* (Biota 2008a). Further assessment includes dunes of suitable depth and excluding areas where rocks, gravel or shell fragments are present. One individual located on the eastern side of Anketell Point (See Plate 3) was found under man-made debris in primary white (pale) dunes with scattered *Acacia spp.* and small grasses. The animal was captured within 6 m of a mangrove inlet.

On the eastern side of Dixon Island the environment where several animals have been captured is slightly different. In this location the environment consists of fine white sands on low primary dunes with open *Acacia coriacea* Shrubland over *Cenchrus ciliaris* (Buffle grass) and *Aerua javanica* (See Plate 4). The site has very little surface debris and one specimen was captured under a dead clump of *Cenchrus ciliaris*. Specimens captured at Cleaverville Beach and near Point Samson were found in a very similar environment to that on Dixon Island, consisting of primary dunes with open *Acacia coriacea* Shrubland over *Cenchrus ciliaris* and *Aerua javanica*.



Figure 1. Habitat areas available to *L. neviniae* within known locations.



Figure 2. *L. neviniae* records. (Represented by triangles).



Plate 3. Habitat at Anketell Point. (Photo Glen Gaikhorst)



Plate 4. *Lerista neviniae* habitat Dixon Island. (Photo Glen Gaikhorst).

Two individuals were identified inland from Point Samson on what appears to be isolated dunes. These dunes have a darker sandy soil and lack the coastal vegetation previously identified. The dunes are dominated by *Cenchrus ciliaris* and this weed occurs in most of the sites visited in the Point Samson area.

Based on current knowledge of *L. neviniae*, the species' habitat consists of dunes within 2km of the coast of pale to dark, loose sand supporting scattered low shrubs of *Acacia coriacea* 10–30% and/or the introduced *Cenchrus ciliaris* and *Aerva javanica* over *Spinifex longifolius* 10–30%.

Museum Records

Eighteen individuals reside in the WAM of which 15 were measured and sexed. The remaining three were all measured but two remained too small to sex. Of the 15 samples ten were males and five were female. The SVL range for males is 34–40 mm and TL 20–55 mm. The average SVL is 37.8 mm and TL 40.3 mm. The SVL range

for females is 34–42 mm and TL 42–58 mm. The average SVL is 39.2 mm and TL 48.2 mm. These measurements show that female *L. neviniae* are slightly larger than males, however there is considerable overlap in the range between sexes. These measurements can be seen below in Table 1.

DISCUSSION

Based on the current knowledge of *L. neviniae*, it is likely to be restricted to coastal and near-coastal sand dunes from Cleaverville Beach to the northern side of Cape Lambert (near to Point Samson). It is possible that *L. neviniae* occurs on the remainder of Dixon Island (western side) in suitable habitat, however the species is likely to only occur in low numbers on the western side of Dixon Island given that targeted surveys have been undertaken in this area and no specimens were recorded. Between Karratha and Cleaverville Beach,

Table 1. *L. neviniae* retained at the WAM, sexed and measured.

WAM ID	Location collected	Sex	SVL	TL	Date collected
R135295 (Holotype)	Cape Lambert	Male	37	46	28/10/1998
R135306 (Paratype)	Cape Lambert	Female	40	42	27/10/1998
R150102	Cape Lambert	Female	42	45	17/06/2009
R151303	Cape Lambert		34	45	17/07/2002
R163490	Cape Lambert	Male	40	20	10/07/2008
R163491	Cape Lambert	Female	40	58	10/07/2008
R163492	Cape Lambert	Sub Adult	31	20	10/07/2008
R163493	Cape Lambert	Female	40	48	10/07/2008
R163494	Cape Lambert	Male	39	32	10/07/2008
R164337	Cape Lambert	Male	39	40	6/10/2007
R164338	Cape Lambert	Male	34	51	6/10/2007
R164339	Cape Lambert	Male	38	55	6/10/2007
R164340	Cape Lambert	Male	39	31	7/10/2007
R164341	Cape Lambert	Male	36	33	6/10/2007
R164342	Cape Lambert	Male	38	48	7/10/2007
R164343	Cape Lambert	Male	38	47	06/10/2007
R166911	Dixon Island	Female	34	48	13/01/2009
R166912	Dixon Island	Juvenile	25	34	14/01/2009

suitable habitat is present but no specimens have been recorded during targeted searches in that area. However the habitat in the Karratha and Cleaverville Beach area is severely degraded by off road vehicles and sand mining operations.

On the mainland, the species has been recorded as far north as half way between Point Samson and Cossack on an isolated sand dune. However, no specimens have been recorded at Cossack or Settlers Beach which has a large expanse of suitable habitat.

Three other species of *Lerista* are known to occur in the region and are sometimes in sympatry with *L. neviniae*. These are *L. bipes*, *L. clara* and *L. verhmens*.

L. bipes is the most often-caught species of *Lerista* in the region, with 117 individuals recorded during one survey effort (GHD 2011). This species appears to utilise a range of habitat types and is sympatric with *L. neviniae*.

Lerista clara is recorded regularly in the Cossack, Karratha and Settlers Beach areas and, like *L. neviniae*, is found in loose soils under woody debris. *L. clara* is a member of the “muelleri” species complex and appears less common in areas where *L. neviniae* is present. Alternatively *L. neviniae* is absent where *L. clara* occurs in high numbers. Biota (2008b) found clear separation between *L. clara* and *L. neviniae* in searches and suggest that the presence of *L. clara* may limit *L. neviniae*'s presence.

L. clara is a slightly larger species than *L. neviniae* (SVL 49 mm versus 41 mm, respectively), appears to be more robust in habitat usage and occur over a much larger environmental range. It is possible that as *L. clara* moves into *L. neviniae* habitat the species is ‘out muscling’ its smaller counterpart. This could already be happening in the Point Samson area as several hand searches for *L. neviniae* in this area have been undertaken with only two individuals discovered near the town site. In prime *L. neviniae* habitat the species is relatively common and is generally found within the first 20 minutes of searching, with up to 25 individuals found at one site (Biota 2008b).

L. verhmens has been found living in the same area as

L. neviniae but is separated by its environmental selection. It generally favours a rocky, heavier clayey-loam soil, although at Cleaverville *L. verhmens* was recorded on coastal sands (Biota 2008b) and therefore was potentially sympatric with *L. neviniae*. On Dixon Island, *L. verhmens* was only recorded only on rocky ridgelines and *L. neviniae* on coastal dunes.

Impacts to the species

Lerista neviniae habitat lies within an area of Western Australia that is recognised as a key mining region with established port infrastructure and accommodation for workers. This area of the Pilbara has experienced considerable interest for future developments in mining and infrastructure expansions which could impact on *L. neviniae* habitat. Currently the species is known to occur in approximately 600 ha of coastal habitat. With on-going development plans in the area this is likely to reduce the amount of habitat available for the species.

The human population of the region has increased in response to the mining industry; as such the pressure on recreational areas in the region has increased off-road vehicle traffic and pedestrian movement on coastal dune and beach habitats. This is evident at Cleaverville Beach and numerous small sandy beaches near Point Samson. Vehicle traffic on dunes is likely to affect the stability of the dune and the vegetation. Additionally, fires and firewood collection in these areas has reduced fallen woody debris for the species to hide, limiting micro habitats available. This in turn may increase competition with *L. clara*, although this needs to be further investigated.

During hand-foraging on Dixon Island in 2010 that targeting dead *Cenchrus ciliaris* (Buffel Grass) clumps, it was noted that at least two dead *L. bipes* were entangled in buffel grass root systems. Both specimens were petrified but appeared stuck, woven between the upper woody stalks of the remaining roots. No dead *L. neviniae* were recorded, however, Buffel Grass is commonly found in *L. neviniae* habitat and may impact on populations; however, this is speculative and needs to be further investigated.

CONCLUSION

L. neviniae was thought restricted to the Cape Lambert area; this study demonstrates a slightly broader distribution although the extent of suitable environment is only approximately 600 ha. With additional surveys new areas may be identified but available habitat for this species is limited to coastal or near coastal fringe pale dunes in the western Pilbara. The species' range is within an area that is experiencing expansion via mining and infrastructure projects and may impact on the species long term persistence. Therefore, while currently listed as vulnerable, it may meet a higher category due to the area of occupancy, population size and likely threats. Additionally none of the species' range is currently protected under conservation estate.

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